

## 6.4 Slope-Intercept Form of the Equation for a Linear Function

### LESSON FOCUS

Relate the graph of a linear function to its equation in slope-intercept form.

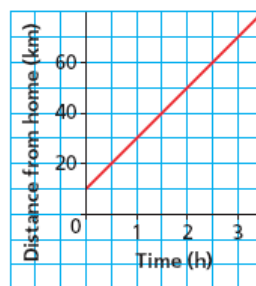
### Make Connections

This graph shows a cyclist's journey where the distance is measured from her home.

What does the vertical intercept represent?

What does the slope of the line represent?

Graph of a Bicycle Journey



### THINK ABOUT IT

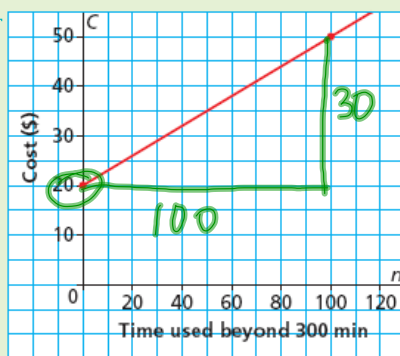
Work with a partner.

A cell phone plan charges a monthly fee that covers the costs of the first 300 min of phone use. This graph represents the cost of the plan based on the time beyond 300 min.

How do you know this is the graph of a linear function?   
 What does the slope of the graph represent?

Write an equation to describe this function.   
 Verify that your equation is correct.

Cost of Cell Phone Plan



$$C = 0.3n + 20$$

Annotations:   
 -  $0.3$  is circled in red and labeled "slope".   
 -  $+ 20$  is circled in red and labeled "y-int.".   
 - A red arrow points from the text "y-int." to the  $+ 20$  term.

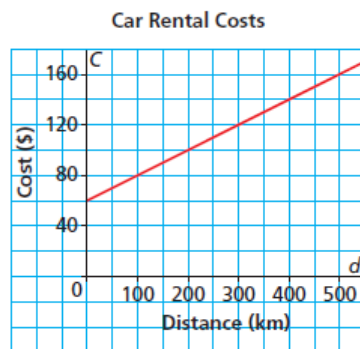
Handwritten calculations:   
 -  $\frac{\text{rise}}{\text{run}} = \frac{\$30}{100 \text{ min}} = \$0.3/\text{min}$    
 -  $30 \div 100 = 0.3$

6.4 Slope-Intercept Form of the Equation for a Linear Function

$$y = 0.3x + 20$$

Annotations:   
 -  $0.3$  is labeled "slope" with an arrow.   
 -  $20$  is labeled "y-int." with an arrow.

In Chapter 5, Lesson 5.6, we described a linear function in different ways.  
The linear function below represents the cost of a car rental.



An equation of the function is:

$$C = 0.20d + 60$$

The number 0.20 is ?

The number 60 is ?

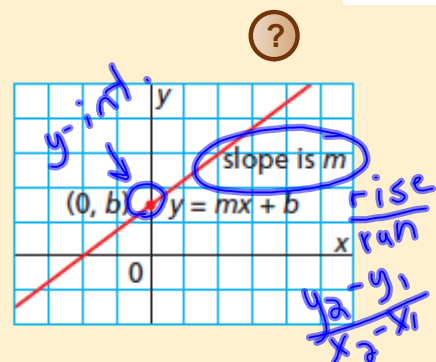
6.4 Slope-Intercept Form of the Equation for a Linear Function

In general, any linear function can be described in slope-intercept form.

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## Slope-Intercept Form of the Equation of a Linear Function

The equation of a linear function can be written in the form  $y = mx + b$ , where  $m$  is the slope of the line and  $b$  is its y-intercept.



6.4 Slope-Intercept Form of the Equation for a Linear Function

**Example 1****Writing an Equation of a Linear Function  
Given Its Slope and y-Intercept**

The graph of a linear function has slope  $\frac{3}{5}$  and y-intercept  $-4$ .  
Write an equation for this function.

 **SOLUTION**

$$y = \frac{3}{5}x - 4$$

$$y = mx + b$$

slope      y-int



6.4 Slope-Intercept Form of the Equation for a Linear Function

**Practice:**

1. The graph of a linear function has slope  $-\frac{7}{3}$  and y-intercept 5.  
Write an equation for this function.



$$y = mx + b$$

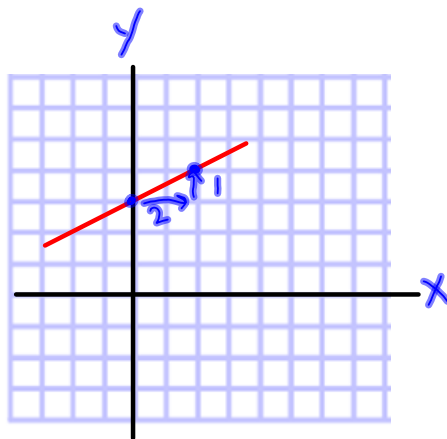
$y = -\frac{7}{3}x + 5$

**Example 2****Graphing a Linear Function Given Its Equation in Slope-Intercept Form**

Graph the linear function with equation  $y = \frac{1}{2}x + 3$

$$m = \frac{1}{2} = \frac{\text{rise}}{\text{run}}$$

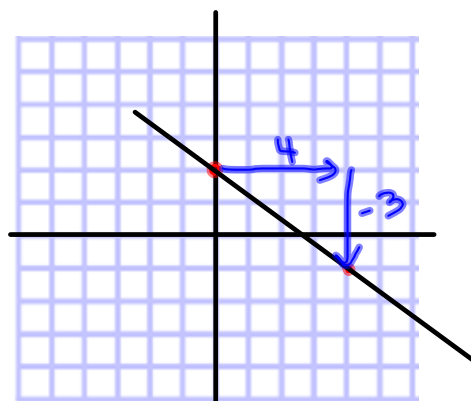
✓ **SOLUTION**



6.4 Slope-Intercept Form of the Equation for a Linear Function

**Practice**

2. Graph the linear function with equation:  $y = -\frac{3}{4}x + 2$



**Example 3****Writing the Equation of a Linear Function  
Given Its Graph**

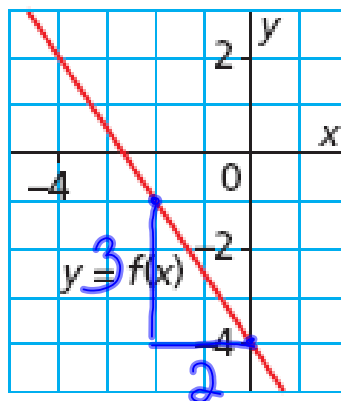
Write an equation to describe this function.  
Verify the equation.

✓ **SOLUTION**

$$y = \textcircled{m}x + b$$

↑                      ↑

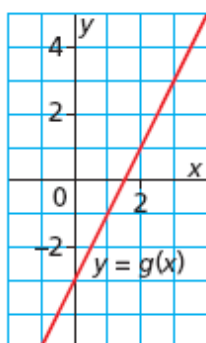
$$y = -\frac{3}{2}x - 4$$



6.4 Slope-Intercept Form of the Equation for a Linear Function

**Practice**

3. Write an equation to describe this function. Verify the equation.



## Classwork/Homework

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